

## **REMARKS**

Claims 1-31 are in the case. In the office action, the drawing and specification were objected to and Claims 1-2 and 20-21 were rejected under 35 USC § 103(a) over U.S. Patent No. 6,523,935 to Torgerson et al. in view of U.S. Patent No. 6,106,096 to Komplin et al. and U.S. Patent No. 6,967,886 to Alfekri et al. Claims 3-4, 6-8, 11, 15-19, 22-25, and 28-31 were rejected under 35 USC § 103(a) over the '935 patent. Claims 12-13 and 26-27 were rejected under 35 USC § 103(a) over the '935 patent in view of U.S. Patent No. 6,283,584 to Powers et al. and the '886 patent. Claim 14 was rejected under 35 USC § 103(a) over the '935 patent in view of the '584 patent and U.S. Patent No. 3,861,598 to Fleischer. Claims 5 and 9-10 were objected to but were indicated as allowable if rewritten in independent form, for which indication the applicants thank the Examiner.

By the foregoing amendment, it is believed that the objections to the specification and drawings have been overcome. Support for the amendment to the specification can be found in the specification on page 6 lines 20-26. No new matter has been introduced into the specification by the amendments. The Applicants respectfully traverse the Examiner's rejections under 35 USC § 103(a). Reconsideration and allowance of the claims are respectfully requested.

### **A. DRAWINGS OBJECTIONS**

The drawings were objected to because of informalities. The drawings are hereby amended to provide reference sign B in FIG. 6 and reference numeral 66 in FIG. 7 as shown in the attached marked up copies of the drawings. With regard to the notations NA and NC on pages 7 and 8 of the specification, these terms are abbreviations used in the inequalities 2 and 3 on page 8 and are not intended to be reference signs for any of the features illustrated in the drawings. Reconsideration and withdrawal of the objection to the drawings in view of the foregoing are respectfully requested.

**B. CLAIMS 1-2 AND 20-21 ARE PATENTABLY DISTINGUISHED OVER THE CITED REFERENCES.**

The invention relates to a printhead design that enables increased print resolution without significantly increasing the size of the printhead. In particular, aspects of the invention enable a substantially linear arrangement of ink chambers 32 in a single column or array as shown in FIG. 6, as opposed to a staggered arrangement of ink chambers 50 and 52 as shown in FIG. 5. That is, each ink chamber and corresponding nozzle in FIG. 6 is substantially the same distance from the fluid feed edge 40 whereas in FIG. 5 ink chamber 52 is at a greater distance than ink chamber 50 from the edge 54. Likewise, each ink ejection actuator in the chambers 32 are substantially the same distance from the edge 40. Accordingly, the applicants have devised design that enables a nozzle hole pitch ranging from about 600 to about 2400 dpi in a substantially linearly aligned arrangement of nozzles.

In all of the rejections of claims 1-31, the '935 patent to Torgerson, et al. is cited as the primary reference. However, the '935 patent suggests and discloses a nozzle pitch that is a composite of nozzles in two separate columns rather than in a single linearly aligned arrangement of nozzles as provided by the present invention. That is, adjacent nozzles in the '935 patent are spaced apart with a pitch of 600 dpi or less. See column 4 lines 53-58 of the '935 patent. A second column of nozzles having the same pitch is offset from a first column of nozzles 1/1200 of an inch along the L axis. But these nozzles are not adjacent to the first column of nozzles. Hence, unlike the present invention, the '935 patent requires two spaced apart and staggered columns of nozzles to achieve the same pitch or print resolution as a single column of nozzles provided by the invention of claims 1 and 20.

The examiner admits that the '935 patent is deficient in disclosing ink ejection actuators having the claimed aspect ratio as provided in claims 1 and 21. Accordingly, the '935 patent does not provide all of the elements of the claimed invention.

In an attempt to cure the deficiencies of the '935 patent to provide all of the elements of the claimed invention, the '096 patent to Komplin is combined with the '935

patent. The '096 patent is directed to use of a polymeric layer between the nozzle plate and substrate to reduce stresses in the nozzle plate. There is absolutely nothing in the '096 patent with regard to a spacing between the ink chambers and a fluid feed edge and thus the '096 patent also does not provide the limitations of claims 1 and 20 missing from the '935 patent. The examiner also admits that the '096 patent fails to disclose ink ejection actuators having the claimed aspect ratio provided in claims 1 and 21. Accordingly, the '096 patent combined with the '935 patent does not provide all of the elements of the claimed invention.

The '886 patent to Alfékri, et al. is also combined with the '935 patent and the '096 patent in an attempt to provide the claimed invention. However, the '886 patent relates only to printing on certain media and has no disclosure whatsoever with regard to nozzle spacing or pitch. Accordingly, a combination of the '935 patent with the '096 patent and the '886 patent thus does not provide all of the elements of claims 1 and 20 as set forth above, specifically the nozzle pitch provided by adjacent nozzles as claimed. Furthermore, the heaters (76, 78, 80 and 82, referred to by the examiner, provide only substrate heating and are not ink ejection actuators having the claimed aspect ratio. The ink ejection actuators in the '886 patent are the drop forming resistors 70. There is no teaching or suggestion in the '886 patent as to an aspect ratio of the drop forming resistors 70. Accordingly, the '886 patent combined with the other references fails to cure all of the deficiencies of the combined references to provide the claimed invention of claims 1-2 and 20-21.

In view of the failure of the combined references to provide all of the elements of claims 1 and 20, no prima facie case of obviousness has been made out by the examiner. Accordingly, claim 2 dependent on claim 1 and claim 21 dependent on claim 20, which provide additional important limitations, are patentable over the cited references for the same reasons claims 1 and 20 are patentable over the cited references. It is well settled law that the combined references must provide all of the elements of the claimed invention. In this case, important elements of the claimed invention are missing from the combined references. Since no prima facie case has been made out by the examiner,

reconsideration and withdrawal of the §103 rejection of claims 1-2 and 20-21 are believed in order and are respectfully requested.

**C. CLAIMS 3-4, 6-8, 11, 15-19, 22-25, AND 28-31 ARE PATENTABLY DISTINGUISHED OVER THE CITED REFERENCE.**

The deficiencies of the '935 patent to provide all of the elements of the claimed invention are set forth above and are incorporated by reference thereto in these remarks about the patentability of claims 3-4, 6-8, 11, 15-19, 22-25 and 28-31.

Claims 3-4, 6-8, and 11 depend from claim 1, claims 15-19 depend from claim 12, claims 22-25 depend from claim 20 and claims 28-31 depend from claim 26 and provide additional important aspects for the invention. All of the independent claims have the limitation regarding the nozzle pitch and distance from the ink feed edge for adjacent nozzles described above. As set forth above, this important limitation is not suggested or disclosed by the '935 patent.

The examiner's assertion that that the '935 patent discloses a nozzle pitch that provides 1200 dpi and up to 2400 dpi and thus the resistors would have to have a width of 15 microns or less is manifestly flawed. The examiner has failed to recognize that the '935 patent requires two separate spaced apart nozzle columns rather than adjacent nozzles in a single column to achieve the foregoing print resolution. The two columns of nozzles in the '935 patent do not contain "adjacent" with the designated pitch required by the claims of the present application. Furthermore, since the nozzles in the '935 patent are not adjacent to one another, the width of the resistors can be greater than 15 microns. By contrast, applicants have devised a method and structure that enables the obtainment of the print resolution using a single column of adjacent nozzles. Since the '935 patent fails to suggest or disclose all of the limitations of the independent claims 1, 12, 20, and 26, the '935 patent also fails to suggest or disclose all of the limitations of claims 3-4, 6-8, 11, 15-19, 22-25, and 28-31. The rejection of the foregoing claims is wholly untenable and should be withdrawn.

**D. CLAIMS 12-13 AND 26-27 ARE PATENTABLY DISTINGUISHED OVER THE CITED REFERENCES.**

In the rejection of claims 12-13 and 26-27, the '935 patent is combined with the '584 patent and the '866 patent. Claims 12 and 26 have the limitation regarding the nozzle pitch and distance from the ink feed edge for adjacent nozzles described above. As set forth in sections B and C above, this important limitation is not suggested or disclosed by the '935 patent. Likewise, the aspect ratio of the ink ejection actuators provided in claims 12 and 27 is not suggested or disclosed by the '935 patent as set forth in section B above.

The '584 patent to Powers, et al. is directed to a flow feature structure for an ink jet printer and is not combined with the other references to provide the missing elements regarding the nozzle pitch or distance from the ink feed edge. As set forth in the office action, the '584 patent also fails to suggest or disclosed the claimed aspect ratio of the ink ejection actuators. Hence, this reference combined with the '935 patent fails to provide all of the elements of the claimed invention.

Likewise the '866 patent is also deficient in providing all of the elements of the claimed invention as set forth in section B above. Since, the combined references do not provide all of the limitations of claims 12-13 and 26-27, the §103 rejection of these claims is wholly untenable and should be withdrawn. Reconsideration and allowance of claims 12-13 and 26-27 are respectfully requested.

**E. CLAIM 14 IS PATENTABLY DISTINGUISHED OVER THE CITED REFERENCE.**

Claim 14 is dependent on claim 12 and provides nozzles having bicircular dimensions. Since claim 14 depends from claim 12, claim 14 is patentable over the '935 patent and the '096 patent for the same reasons claim 12 is patentable over these references as set forth in section C above.

The '598 patent is directed to hand nozzles for spraying materials onto automobiles rather than to ink jet printers. The '598 patent fails to cure the deficiencies of the other references and is cited only for disclosure of nozzle cross-sections. However, the examiner has failed to find motivation in the '598 patent or in the '935 patent or '096 patent for selecting the nozzle cross-sections described in the '598 patent. Since there is

no motivation in the references to make the modification suggested by the examiner and since the '598 patent in combination with the other references fails to provide all of the limitations of the claimed invention, as described above, the rejection of claim 14 is wholly untenable and should be withdrawn.

## **COMBINATION OF REFERENCES**

The MPEP outlines three conditions that must be met for a *prima facie* case of obviousness to be made out. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations.

### **1. Motivation**

The statements of the Examiner in regard to the motivation to combine the various references discussed above amount to no more than conclusory statements of generalized advantages and convenient assumptions about what was known by skilled artisans.

The present claims are directed toward printheads and related apparatus. Thus, the claims recite certain elements in combination, which when combined produce the structure. While it might be possible to find each and every element of the claims somewhere in the prior art, applicants assert that they have combined these possibly-known elements in a novel and nonobvious manner to produce an apparatus that has great benefits.

The Examiner has selected a set of prior art references, which may contain one or more of the elements recited in the present claims. However, the elements selected by the Examiner are used in combination with many other elements that are not used in the present claims. The Examiner has selectively extracted from the cited references only those elements that are common with the present claims, and has rearranged those selected elements in a manner where they align with the presently claimed apparatus.

However the examiner has failed to articulate what was obvious to one of ordinary skill in the art about selecting that special set of elements from the prior art.

What the Examiner has not done, and what the Examiner must do, is provide proper motivation for making the selection and combination of prior art elements. Applicants assert that without the proper motivation, the combination of elements as recited by the Examiner is not obvious. As noted above, the mere fact that various elements *could be* placed in combination is not a sufficient motivation for actually making the combination. An infinite number of different elements *could be* placed in combination, but in order to make the present combination obvious, there must be a motivation in the references to make the combination.

Furthermore, it is respectfully submitted that the references cited do not support combining the elements as claimed in the present invention. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d (BNA) 1566 (Fed. Cir. 1990) states that the PTO erred in rejecting a claimed invention as an obvious combination of the teaching of prior art references when the prior art provided no teaching, suggestion, or incentive supporting the combination. *See Northern Telecom Inc. v. Datapoint Corp.*, 15 U.S.P.Q.2d 1321, 1323, *In re Geiger*, 2 U.S.P.Q.2D 1276, 1278. *SmithKline Diagnostics, Inc. v. Helena Laboratories Corp.*, 859 F.2d 878, 887, 8 U.S.P.Q.2d (BNA) 1468, 1475 (Fed. Cir.1988) states that one “cannot pick and choose among the individual elements of assorted prior art references to recreate the claimed invention.”

There is nothing in the prior art cited to lead a person of ordinary skill to design an apparatus like that of the present invention, other than the hindsight knowledge of this invention. The office action recites certain generalized benefits (realized in hindsight after considering the invention) as motivation for the combination of the references. However, these generalized motivations do not make obvious the combination of the references to produce the claimed invention. Only after considering the invention is it understood that combining the references (and adding a great deal more) tends to produce the motivating elements.

This, however, does not satisfy Section 103. The motivation to combine references cannot come from the invention itself. *See In re Oetiker*, 24 U.S.P.Q.2D 1443, 1446. The claims of the present application appear to have been used as a frame, and

individual parts of separate prior art references were employed to recreate a facsimile of the claimed invention. See *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 312. There is no explanation of what there was in the prior art that would have caused those skilled in the art to combine the references in the manner they are combined by the examiner.

The Examiner has the burden to show some teaching or suggestion in the references to support their use in the particular claimed combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 5 U.S.P.Q.2D at 1438-1439. In the absence of such, applicants respectfully suggest that the references are improperly combined.

## **2. *Expectation of Success***

It is a requirement in making out a *prima facie* case of obviousness that there must be some expectation of success of the combination constructed by the Examiner. However, the combination proposed by the Examiner would have no such expectation of success. The reason for this is that the Examiner has combined the teaching of references that are sufficiently different, one from another, as to have no *expectation* of success by one skilled in the art. For example, the Examiner has cited nozzle shapes from U.S. Patent No. 3,861,598 to Fleischer in U.S. Class 239 (Fluid Sprinkling, spraying, and diffusing), attempting to apply such nozzle shapes to micro-fluid ejection devices in a totally unrelated art in U.S. Class 347 (Incremental printing of symbolic information). The Examiner has cited no expectation of success that nozzles from a completely unrelated art and on an entirely different scale would be beneficially used at the micro scale of printhead nozzle plates.

## **3. *All Limitations Taught or Suggested***

It is a requirement in making out a *prima facie* case of obviousness that all of the limitations of the claims must be taught or suggested by the combined references. However, the Examiner has omitted some of the claimed elements, or at least certain important aspects of the claimed elements, especially those found in the independent claims. For example, Applicant's nozzle hole spacing dpi values of about 1200 and up to 2400 dpi using adjacent nozzles (i.e., a single column of nozzles). No additional columns



of nozzles in staggered formation are required as with the '935 patent to Torgerson et al. to achieve the same dpi values.

### CONCLUSION

Applicants assert that the claims of the present application patentably define over the prior art made of record and not relied upon for the same reasons as given above. Applicants respectfully submit that a full and complete response to the office action is provided herein, and that the application is now fully in condition for allowance. Action in accordance therewith is respectfully requested.

Respectfully submitted,

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